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Claims

[c1] 1. An underrun protection arrangement for a frame-including vehicle (1), the arrangement comprising:
an impact element (7) positioned to confront an anticipated stress from a force, F, experienced in the event of a collision with another vehicle (2);
at least one link element (8) connected to the impact element (7) and configured to be pivotably fixed to a frame member (3) of an incorporating vehicle (1); and
an energy-absorbing element (11) connected to the impact element (7) and interconnectable to the frame (3), the energy-absorbing element (11) being adapted to be compressed in the event of pivoting movement of the impact element (7) and further comprising at least one locking element (10) adapted to permit pivoting movement of the impact element (7) only in the event of a force being imposed on the impact element (7) of a magnitude that exceeds a predetermined force limit, wherein said predetermined force limit is defined as an anticipated stress in the event of a collision with a passenger car following essentially complete compression of crumple zones provided in the passenger car.

[c2] 2. The underrun protection arrangement as recited in claim 1, wherein the locking element (10) comprises at least one retaining bolt extending through each link element (8) and configured to maintain a fixed connection between the link element (8) and the frame (3) until the predetermined force limit is reached.

[c3] 3. The underrun protection arrangement as recited in claim 1, wherein the energy-absorbing element (11) comprises a tubular component compressible in a longitudinal direction thereof, one end section of the tubular component being firmly connected to the impact element (7) and another end section thereof being rotatably connectable to the frame (3).

[c4] 4. The underrun protection arrangement as recited in claim 1, wherein the impact element (7) is mounted to pivot in relation to the frame (3) on a shaft journal (9), the shaft journal (9) running through at least one bracket (4) connectable to the frame (3).

[c5] 5. The underrun protection arrangement as recited in claim 4, wherein the link element (8) overlaps the bracket (4) along an area (A) configured to meet predetermined requirements regarding transverse acting forces on the impact element (7) relative to a longitudinal direction of the vehicle (l).

[c6] 6. The underrun protection arrangement as recited in claim 1, wherein the link element (8) comprises an substantially L-shaped component having two plate-like side elements (8a, 8b), the first side element (8a) extending essentially transversely to the longitudinal direction of the impact element (7) and the second side element (8b) extending essentially in the longitudinal direction of the impact element (7), and the side elements (8a, 8b) being connected to one another.

[c7] 7. The underrun protection arrangement as recited in claim 6, wherein the first side element (8a) is configured to pivot relative to the frame (3).

[c8] 8. The underrun protection arrangement as recited in claim 1, wherein the energy-absorbing element (11) includes a weakening (11a) configured to guide collapse during compression of the energy-absorbing element (11).

[c9] 9. A vehicle having an underrun protection arrangement, the vehicle (1) comprising:
a frame (3);
an impact element (7) positioned to confront an anticipated stress from a force, F, experienced in the event of a collision with another vehicle (2);

at least one link element (8) connected to the impact element (7) and pivotably fixed to the frame member (3) of the vehicle (1); and

an energy-absorbing element (11) connected to the impact element (7) and the frame (3), the energy-absorbing element (11) being adapted to be compressed in the event of pivoting movement of the impact element (7) and further comprising at least one locking element (10) adapted to permit pivoting movement of the impact element (7) only in the event of a force being imposed on the impact element (7) of a magnitude that exceeds a predetermined force limit, wherein said predetermined force limit is defined as an anticipated stress in the event of a collision with a passenger car following essentially complete compression of crumple zones provided in the passenger car.